HS binding AMEXTRACEIIVIAR TRANSMEMbrane Domain Cytoplasmic Domain

Fig. 1

Fig. 2: Syndecan-1 (rat) extracellular domain: M81785

atgagac gtgcggcgct

ctggctttgg ctctgggg tggggtggg cctggaget geeteege aaattgteac cgcaaatgtg cetectgaag accaagatgg ctctggggae gaeteagaea acttetetgg ctcaggeaea ggtgetttge cagatatgae tttgteaegg cagacacett ccaettggaa ggatgtgtgg eteetgaeag ctacaceae ageteeagaa eccaeeagea gggataeega ggeeaeeete acetetatee tgeeggetgg agagaageet gaggagggag ageeegtgge ecaegtggaa geagageetg actteaetge tegggaeaag gagaaggagg ccaeeaeag geetagggag accaeeaeg teeeagteae ecaaeaggee teaaeagaag ecaaeaega gacettgget eceaeagaa egteteatee ecaeggggat gtgeaaeetg geeteaega gacettgget eceaeagaa ecggeeaaee tgaeeateag ecteeaaga tggaggatgg aggaggatgg aggaggatgg aggaggetet gtgaagacaag actteaeet tgaaaeatet ggggagaaea eagetgtgge tggegtegag ectgaeette ggaateagte eceagtggat gaaggageea eagetgtgge taggegtegag ectgaeette ggaateagte eceagtggat gaaggageea eagetgtgge taggegteett ttggaeagga aggaa

ACCESSION M81785

LOCUS RATSYNDECA 2396 bp mRNA ROD 16-JUL-1992

DEFINITION Rattus norvegicus syndecan mRNA, complete cds.

ACCESSION M81785 NID g207140 KEYWORDS syndecan.

SOURCE Rattus norvegicus Epididymal fat pad cDNA to mRNA.

ORGANISM Rattus norvegicus

Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata;

Vertebrata; Eutheria; Rodentia; Sciurognathi; Myomorpha; Muridae;

Murinae; Rattus.

REFERENCE 1 (bases 1 to 2396)

AUTHORS Kojima, T., Shworak, N.W. and Rosenberg, R.D.

TITLE Molecular cloning and expression of two distinct cDNA-encoding

heparan sulfate proteoglycan core proteins from a rat endothelial

cell line

Fig. 3: Syndecan-2 (human) extracellular domain (J 04621):

ggcaggaggg agggagccag aggaaaagaa gaggaggaga aggaggagga cccggggagg gaggcgcggc gcgggaggag gaggggcgca gccgcggagc cagtggcccc gcttggacgc getgetetee agataceee ggageteeag eegegeggat egegegetee egeegetetg cccctaaact tetgeegtag etecetttea agecagegaa tttatteett aaaaccagaa actgaacctc ggcacgggaa aggagtccgc ggaggagcaa aaccacagca gagcaagaag agetteagag ageageette eeggageace aacteegtgt egggagtgea gaaaceaaca agtgagaggg cgccgcgttc ccggggcgca gctgcgggcg gcgggagcag gcgcaggagg aggaagegag egeceegag eeeegageee gagteeeega geetgageeg caategetge ggtactetge teeggatteg tgtgegeggg etegeegage getgggeagg aggettegtt ttgccctggt tgcaagcagc ggctgggagc agccggtccc tggggaatat gcggcgcgc tggatcctgc tcaccttggg cttggtggcc tgcgtgtcgg cggagtcgag agcagagctg acatctgata aagacatgta ccttgacaac agctccattg aagaagcttc aggagtgtat cctattgatg acgatgacta cgcttctgcg tctggctcgg gagctgatga ggatgtagag agtecagage tgacaacaac tegaceactt ecaaagatac tgttgactag tgetgeteea aaagtggaaa ccacgacgct gaatatacag aacaagatac ctgctcagac aaagtcacct gaagaaactg ataaagagaa agttcacctc tctgactcag aaaggaaaat ggacccagcc gaagaggata caaatgtgta tactgagaaa cactcagaca gtctgtttaa acqqacagaa

protein sequence:

GRREGARGKEEEEKEEDPGREARRGRRRGAAAEPVAPLGRAALQ
IPPELQPRGSRAPAALPLNFCRSSLSSQRIYSLKPETEPRHGKGVRGGAKPQQSKKSF
REQPSRSTNSVSGVQKPTSERAPRSRGAAAGGGSRRRRRRRAPPSPEPESPSLSRNRC
GTLLRIRVRGLAERWAGGFVLPWLQAAAGSSRSLGNMRRAWILLTLGLVACVSAESRA
ELTSDKDMYLDNSSIEEASGVYPIDDDDYASASGSGADEDVESPELTTTRPLPKILLT
SAAPKVETTTLNIQNKIPAQTKSPEETDKEKVHLSDSERKMDPAEEDTNVYTEKHSDS
LFKRTE

reference:

ACCESSION J04621

LOCUS HUMHSPGC 3414 bp mRNA PRI 08-NOV-1994 DEFINITION Human heparan sulfate proteoglycan (HSPG) core protein, 3' end. ACCESSION J04621

NID g184428

KEYWORDS core protein; heparan sulfate proteoglycan.

SOURCE Human fetal lung fibroblast, cDNA to mRNA, clone 48K5.

ORGANISM Homo sapiens

Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata; Vertebrata; Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 3414)

AUTHORS Marynen, P., Zhang, J., Cassiman, J.J., Van den Berghe, H. and David, G.

TITLE Partial primary structure of the 48- and 90-kilodalton core

proteins of cell surface-associated heparan sulfate proteoglycans of lung fibroblasts. Prediction of an integral membrane domain and evidence for multiple distinct core proteins at the cell surface of

human lung fibroblasts

JOURNAL J. Biol. Chem. 264 (12), 7017-7024 (1989)

Fig. 4: Synd-3 (N-Syndecan) extracellulare domain

gcccccgcgcgctgctgagccgtccttgcggcacgssgatgcccgcggagctgcggcgc tcqcqqtqctqctqctqctcaqcqcccqcqcqcaqcqctqqctcaqccqtqqcaatq agaactacgagaggccggtggacctggagggctctggggatgatgatccctttggggacg atgaactggatgacatctactcgggctccggctcaggctattttgagcaggagtcagggt tggagacagcggtcagcctcaccacggacacgtccgtcccactgcccaccacggtggccg tgctgcctgtcaccttggtgcagcccatggcaacaccctttgagctgttccccacagagg acacgtcccctgagcaaacaaccagcgtcttgtatatccccaagataacagaagcaccag tgatccccagctggaaaacaaccaccgccagtaccactgccagtgactcccccagtacca ctgtggccacctccaagcccaccactacccagaggttcctgccccctttqtcaccaagg cagccaccacccgggccaccaccctggagacgcccaccacctccatccctgaaaccagtg tectgacagaggtgaccacatcaeggettgteceetecagcacagecaageegaggteee tqccaaaaccaagcacttccaggactgcagaacccacggaaaaaagcactgccttgcctt ccagccccaccacgctgccacccacagaagccccccaggtggagccaggggagttgacga cagtcctcgacagtgacctggaagtcccaaccagtagtggccccagcggggacttcgaga tccaggaggaggagacaactcgtcctgagctgggcaatgaggtggtggcagtggtga caccaccagcagcaccggggctgggcaagaatgcagagccggggctcatcgacaacacaa

Reference: ACCESSION M84910 CHKSNDCPRO 1372 bp LOCUS mRNA 29-NOV-1995 DEFINITION Chicken syndecan-3 proteoglycan mRNA, complete cds. ACCESSION M84910 q1017461 syndecan-3 proteoglycan. KEYWORDS SOURCE Gallus gallus 4-6 day and 10 day forelimb and whole embryo cDNA to ORGANISM Gallus gallus Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata; Vertebrata; Archosauria; Aves; Neognathae; Galliformes; Phasianidae: Phasianinae: Gallus. REFERENCE 1 (bases 1 to 1372) AUTHORS Gould, S.E., Upholt, W.B. and Kosher, R.A. Syndecan 3: a member of the syndecan family of TITLE membrane-intercalated proteoglycans that is expressed in high amounts at the onset of chicken limb cartilage differentiation JOURNAL Proc. Natl. Acad. Sci. U.S.A. 89 (8), 3271-3275 (1992) MEDLINE 92228766 REFERENCE 2 (bases 1 to 1372) AUTHORS Gould, S.E., Upholt, W.B. and Kosher, R.A. TITLE Characterization of chicken syndecan-3 as a heparan sulfate proteoglycan and its expression during embryogenesis JOURNAL Dev. Biol. 168 (2), 438-451 (1995)

atgge geetgtetge etgtttgege egetgetget gttgeteete ggaggtttcc ccgtcgcccc aggcgagtcg attcgagaga ctgaggtcat agacccccaq gaceteetgg aaggeagata ettetetgga geetteeegg aegatgaaga egetggggge cttgagcagg actctgactt tgagctgtcg ggttccggag atctagatga cacggaggag cccaggacct tecetgaggt gattteacce ttggtgecae tagataacca catecccgag aatgcccagc ctggcatccg tgtcccctca gagcccaagg aactggaaga gaatgaggtc attcccaaaa gggtcccctc cgacgtgggg gatgacgatg tgtccaacaa agtgtccatg tocagcactt cocagggcag caacattttt gaaagaactg ag

Reference:

M81786 ACCESSION

16-JUL-1992 LOCUS RATRYUDOCA 2452 bp mRNA ROD

DEFINITION Rattus norvegicus ryudocan mRNA, complete cds.

ACCESSION M81786 NID g206822 ryudocan. KEYWORDS

SOURCE Rattus norvegicus Epididymal fat pad cDNA to mRNA.

ORGANISM Rattus norvegicus

Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata;

Vertebrata; Eutheria; Rodentia; Sciurognathi; Myomorpha; Muridae;

Murinae; Rattus.

REFERENCE 1 (bases 1 to 2452)

 $\label{eq:Kojima} \mbox{Kojima}, \mbox{T., Shworak}, \mbox{N.W. and Rosenberg}, \mbox{R.D.}$ AUTHORS

Molecular cloning and expression of two distinct cDNA-encoding TITLE

heparan sulfate proteoglycan core proteins from a rat endothelial

cell line

Fig. 6: Glypican-1 (rat) extracellular Domain:

atggag

cteegggeee gaggetggtg getgetgtge geggeegeeg egetagtege etgegeege ggggaccccg ccagcaagag ccggagctgc agcgaagtcc gccagatcta cggggctaag ggetttagee tgagegaegt geeceaggea gagatetegg gagageaeet geggatetge ccccaggget acacetgetg caccagtgag atggaggaga acctggccaa ccacagecgg atggagetgg agacegeact ceaegaeage ageegtgeee tgeaggetae actggeeace cagetgeatg geategatga ceaetteeag egeetgetga atgaetegga gegtaeaetg caggatgett tteeegggge etttggggae etgtacaege agaacaeteg ggeetteegg qacctgtatg ctgagctgcg tctctactac cgaggggcca acctacacct tgaggagaca ctggccgagt tetgggcacg getgetggag egtetettea ageagetgea eccecagett ctgctgcccg atgactatct ggactgcctg ggcaagcagg cagaggcact gcggccgttt qqqqatqccc ctcqaqaact gcqcctqaqq gccacccqtq cttttqtqqc qqcacqatcc tttgtgcagg gcctgggtgt ggccagtgac gtagtccgaa aggtggccca ggttcctctg gccccagaat gttctcgggc tgtcatgaag ttggtctact gtgcccattg ccggggagtc cctggtgccc ggccctgtcc cgactattgc cgaaatgtgc tcaaaggctg ccttgccaac caggeegace tggatgeega gtggaggaac eteetggaet eeatggtget cateactgae aagttetggg gecegteggg tgeggagaat gteattggea gtgtgeatat gtggetggeg gaggecatea aegeceteca ggacaacaag gacacactea cagetaaggt catecaggge tgcggaaacc ccaaggtcaa tccccatggc tctgggcctg aggagaagcg tcgccgtggc aaactggcac tgcaggagaa gtcctccaca ggtactctgg aaaagctggt ctctgaggcc aaggeeeage teegagaeat teaggaetae tggateagee teeeagggae aetgtgtagt qaqaaqatqq ccatqaqtcc tgccaqcgat gaccgctgct ggaatgggat ttccaagggc cqqtacctac ctgaggtgat gggtgatggg ctggccaacc agatcaacaa ccctgaagtg gaggtggaca tcaccaagcc ggatatgacc atccggcagc agatcatgca gctcaagatc atgaccaacc gtttacgtgg cgcctacggt ggcaatgatg tggacttcca ggatgccagt gatgacggca gtggctccgg cagcggtggc ggatgcccag atgacgcctg tggccggagg gtcagcaaga agagetecag etceeggace eeettgacee atgeeetece eggettqtca gaacaggagg gacagaagac ctcg

Protein sequence:

MELRARGWWLLCAAAALVACARGDPASKSRSCSEVRQIYGAKGF
SLSDVPQAEISGEHLRICPQGYTCCTSEMEENLANHSRMELETALHDSSRALQATLAT
QLHGIDDHFQRLLNDSERTLQDAFPGAFGDLYTQNTRAFRDLYAELRLYYRGANLHLE
ETLAEFWARLLERLFKQLHPQLLLPDDYLDCLGKQAEALRPFGDAPRELRLRATRAFV
AARSFVQGLGVASDVYRKVAQVPLAPECSRAVMKLVYCAHCRGVPGARPCPDYCRNVL
KGCLANQADLDAEWRNLLDSMVLITDKFWGPSGAENVIGSVHMWLAEAINALQDNKDT
LTAKVIQGCGNPKVNPHGSGPEEKRRGKLALQEKSSTGTLEKLVSEAKAQLRDIQDY
WISLPGTLCSEKMAMSPASDDRCWNGISKGRYLPEVMGDGLANQINNPEVEVDITKPD
MTIRQQIMQLKIMTNRLRGAYGGNDVDFQDASDDGSGSGGGGCPDDACGRRVSKKSS
SSRTPLTHALPGLSEQEGQKTSA

```
Reference:
ACCESSION L34067
NID g506416
KEYWORDS glypican.
```

REFERENCE

SOURCE Rattus norvegicus (strain New England Deconess Hospital) cDNA to

mRNA.

ORGANISM Rattus norvegicus

Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata;

Vertebrata; Eutheria; Rodentia; Sciurognathi; Myomorpha; Muridae;

Murinae; Rattus. 1 (bases 1 to 1737)

AUTHORS Litwack, E.D., Stipp, C.S., Kumbasar, A. and Lander, A.D.

TITLE Neuronal expression of glypican, a cell-surface

glycosylphosphatidylinositol-anchored heparan sulfate proteoglycan,

in the adult rat nervous system

JOURNAL J. Neurosci. 14, 3713-3724 (1994)

Fig. 7: Syndecan-1 (rat) transmembrane domain: M81785

gtgct gggaggtgtc attgctggag gcctggtggg cctcatcttt gctgtgtgcc tggtggcttt catgctatac

Reference:

ACCESSION M81785

LOCUS RATSYNDECA 2396 bp mRNA ROD 16-JUL-1992

DEFINITION Rattus norvegicus syndecan mRNA, complete cds.

ACCESSION M81785 NID g207140 KEYWORDS syndecan.

SOURCE Rattus norvegicus Epididymal fat pad cDNA to mRNA.

ORGANISM Rattus norvegicus

Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata;

Vertebrata; Eutheria; Rodentia; Sciurognathi; Myomorpha; Muridae;

Murinae; Rattus.

REFERENCE 1 (bases 1 to 2396)

AUTHORS Kojima, T., Shworak, N.W. and Rosenberg, R.D.

TITLE Molecular cloning and expression of two distinct cDNA-encoding heparan sulfate proteoglycan core proteins from a rat endothelial

cell line

Fig. 8: Syndecan-2 (human) transmembrane domain (J 04621):

gtcctagcag ctgtcattgc tggtggagtt attggctttc tctttgcaat ttttcttatc ctgctgttgg tg

protein sequence:

VLAAVIAGGVIGFLFAIFLILLLV

reference:

ACCESSION J04621

3414 bp mRNA PRI 08-NOV-1994 LOCUS HUMHSPGC DEFINITION Human heparan sulfate proteoglycan (HSPG) core protein, 3' end.

J04621 ACCESSION g184428 NID

core protein; heparan sulfate proteoglycan. KEYWORDS

Human fetal lung fibroblast, cDNA to mRNA, clone 48K5. SOURCE

ORGANISM Homo sapiens

Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata; Vertebrata; Eutheria; Primates; Catarrhini; Hominidae; Homo.

1 (bases 1 to 3414) REFERENCE

Marynen, P., Zhang, J., Cassiman, J.J., Van den Berghe, H. and David, G. Partial primary structure of the 48- and 90-kilodalton core AUTHORS

TITLE

proteins of cell surface-associated heparan sulfate proteoglycans of lung fibroblasts. Prediction of an integral membrane domain and evidence for multiple distinct core proteins at the cell surface of

human lung fibroblasts

J. Biol. Chem. 264 (12), 7017-7024 (1989) JOURNAL

Fig. 9: Synd-3 (N-Syndecan) chicken Transmembrane domain

Reference: ACCESSION M84910 LOCUS CHKSNDCPRO 1372 bp mRNA VRT 29-NOV-1995 DEFINITION Chicken syndecan-3 proteoglycan mRNA, complete cds. ACCESSION M84910 NID g1017461 syndecan-3 proteoglycan. KEYWORDS SOURCE Gallus gallus 4-6 day and 10 day forelimb and whole embryo cDNA to Gallus gallus Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata; Vertebrata; Archosauria; Aves; Neognathae; Galliformes; Phasianidae; Phasianinae; Gallus. REFERENCE 1 (bases 1 to 1372) AUTHORS Gould, S.E., Upholt, W.B. and Kosher, R.A. TITLE Syndecan 3: a member of the syndecan family of membrane-intercalated proteoglycans that is expressed in high amounts at the onset of chicken limb cartilage differentiation JOURNAL Proc. Natl. Acad. Sci. U.S.A. 89 (8), 3271-3275 (1992) MEDLINE 92228766

REFERENCE 2 (bases 1 to 1372)

AUTHORS Gould, S.E., Upholt, W.B. and Kosher, R.A.

TITLE Characterization of chicken syndecan-3 as a heparan sulfate

proteoglycan and its expression during embryogenesis

JOURNAL Dev. Biol. 168 (2), 438-451 (1995)

Figure /0: Syndecan-4 transmembrane domain from rat: M81786

gtcttggc agctctgatt gtgggcggcg tagtgggcat cctcttcgcc gttttcctga tcctgctgct ggtgtac

Reference:

ACCESSION M81786

LOCUS RATRYUDOCA 2452 bp mRNA ROD 16-JUL-1992

DEFINITION Rattus norvegicus ryudocan mRNA, complete cds.

ACCESSION M81786 NID g206822

KEYWORDS ryudocan.

SOURCE Rattus norvegicus Epididymal fat pad cDNA to mRNA.

ORGANISM Rattus norvegicus

Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata;

Vertebrata; Eutheria; Rodentia; Sciurognathi; Myomorpha; Muridae;

Murinae; Rattus.

REFERENCE 1 (bases 1 to 2452)

AUTHORS Kojima, T., Shworak, N.W. and Rosenberg, R.D.

TITLE Molecular cloning and expression of two distinct cDNA-encoding

heparan sulfate proteoglycan core proteins from a rat endothelial

cell line

Fig. // : Glypican-1 (rat) GPI-Transmembrane Domain:

gccgcc actcgcccag agcctcacta cttctttctg ctcttcctgt tcaccttggt ccttgctgca gccaggccca ggtggcggta actgccc

protein sequence:

ATRPEPHYFFLLFLFTLVLAAARPRWR

Reference:

ACCESSION L34067 NID g506416 KEYWORDS glypican.

SOURCE Rattus norvegicus (strain New England Deconess Hospital) cDNA to

mRNA.

ORGANISM Rattus norvegicus

Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata;

Vertebrata; Eutheria; Rodentia; Sciurognathi; Myomorpha; Muridae;

Murinae; Rattus.

REFERENCE 1 (bases 1 to 1737)

AUTHORS Litwack, E.D., Stipp, C.S., Kumbasar, A. and Lander, A.D.

TITLE Neuronal expression of glypican, a cell-surface

glycosylphosphatidylinositol-anchored heparan sulfate proteoglycan,

in the adult rat nervous system JOURNAL J. Neurosci. 14, 3713-3724 (1994)

Figure /2: Perlecan (human) transmembrane domain #M85289

tcgcgacactgctcatcccag ccatcacgactgctgacgccggcttctacctctgcgtggccaccagccctgcaggcactg cc

Reference:

LOCUS HUMHSPG2B 14327 bp mRNA PRI 08-NOV-1994 DEFINITION Human heparan sulfate proteoglycan (HSPG2) mRNA, complete cds.

ACCESSION M85289 NID g184426

KEYWORDS HSPG2 gene; heparan sulfate proteoglycan. SOURCE Homo sapiens skin; colon cDNA to mRNA.

ORGANISM Homo sapiens

Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata; Vertebrata; Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 14327)

AUTHORS Dodge, G.R., Kovalszky, I., Chu, M.L., Hassell, J.R., McBride, O.W.,

Yi, H.F. and Iozzo, R.V.

TITLE Heparan sulfate proteoglycan of human colon: partial molecular cloning, cellular expression, and mapping of the gene (HSPG2) to

the short arm of human chromosome 1

JOURNAL Genomics 10 (3), 673-680 (1991)

MEDLINE 91365376

REFERENCE 2 (bases 1 to 14327)

AUTHORS
Murdoch, A.D., Dodge, G.R., Cohen, I., Tuan, R.S. and Iozzo, R.V.

Primary structure of the human heparan sulfate proteoglycan from basement membrane (HSPG2/perlecan). A chimeric molecule with multiple domains homologous to the low density lipoprotein receptor, laminin, neural cell adhesion molecules, and epidermal

growth factor

JOURNAL J. Biol. Chem. 267 (12), 8544-8557 (1992)

Figure 13: Syndecan-4 cytoplasmic domain from rat: M81786

Cgc atgaagaaga aggatgaagg cagttacgac ttgggcaaga aacccatcta caaaaaagcc cccaccaacg agttctacgc atga

16-JUL-1992

Reference:

ACCESSION M81786

LOCUS RATRYUDOCA 2452 bp mRNA ROD

DEFINITION Rattus norvegicus ryudocan mRNA, complete cds.

ACCESSION M81786 NID g206822

KEYWORDS ryudocan.

SOURCE Rattus norvegicus Epididymal fat pad cDNA to mRNA.

ORGANISM Rattus norvegicus

Eukaryotae; mitochondrial eukaryotes; Metazoa; Chordata;

Vertebrata; Eutheria; Rodentia; Sciurognathi; Myomorpha; Muridae;

Murinae; Rattus.

REFERENCE 1 (bases 1 to 2452)

AUTHORS Kojima, T., Shworak, N.W. and Rosenberg, R.D.

TITLE Molecular cloning and expression of two distinct cDNA-encoding

heparan sulfate proteoglycan core proteins from a rat endothelial

cell line



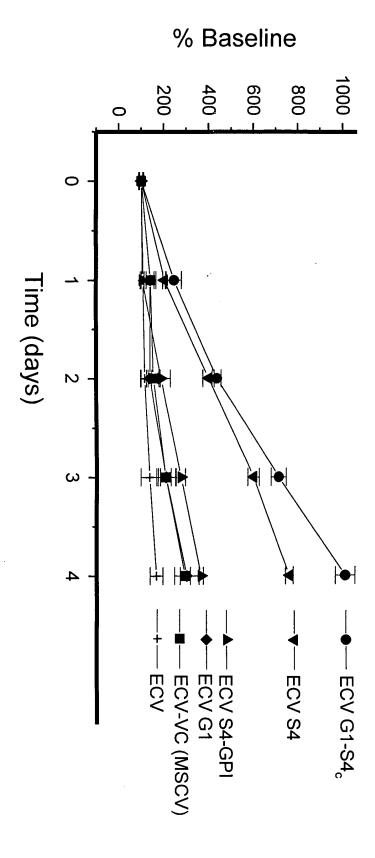


Fig. 15A MSCV

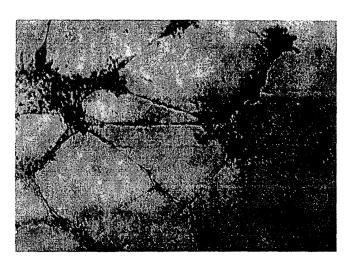


Fig. 15B S4

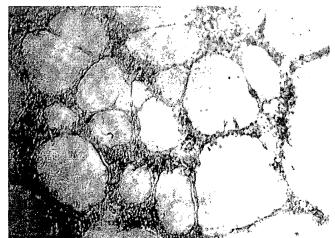


Fig. 15C $G1_{ect}\text{-S4}_{cyt}$

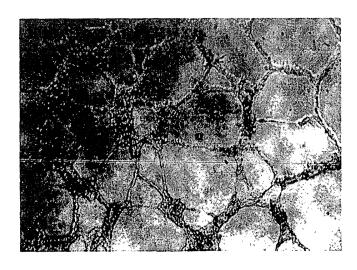


Fig. 16

Cells per high power field

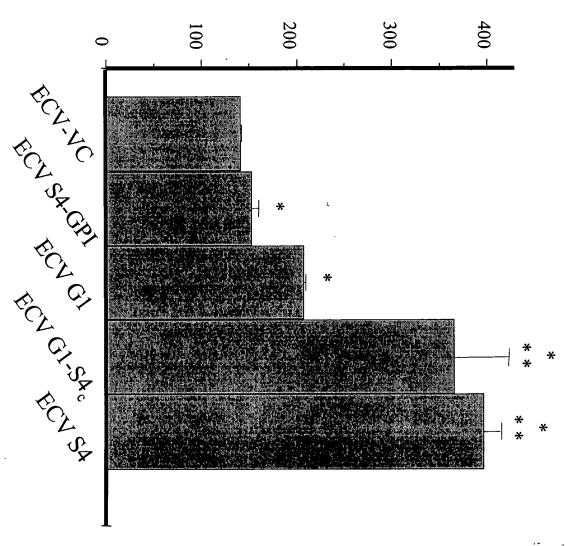


Fig.

r1g. 1/1

Day 3 Day 1 Day 0

WT A B
PR-39
Syndecan-4
Glypican

Fig. 18

